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or others previously. He divides the order into four suborders, the Pareiasauria, Procolophonia, Diadectosauria and Pantylosauria, the last two new. While these terms will be convenient, the present writer doubts whether the distribution proposed of the families is really the best, or whether indeed there is really any need of classificatory terms between the family and order at present.

Dr. Case urges, what has now become apparent, that the Cotylosauria are far from being the beginning of the reptilian stem, that forms so diverse as those we already know from the base of the American Permian must have been long years in developing. Nevertheless they approach that beginning relatively close, and, until the actual beginning is found, must suffice as the basis for the classification of all later reptiles. The writer can not agree with the author in the interpretation of some of the cranial elements in these reptiles, but as that is a subject about which no two authors agree, Dr. Case's views are perhaps as good as those of others. Nor is he assured that the forms *Eosauravus* and *Sauravus* really belong among the Cotylosauria. And, as regards the attachment of the ribs in these "microsaurian" forms, they are really not different from those of all the known Permo-Carboniferous reptiles.

The work has been brought out in excellent shape by the Carnegie Institution, and it will long remain as an indispensable one for all students of the early reptiles.

S. W. WILLISTON

*The Home-life of the Osprey.* By CLINTON G. ABBOTT. London, Witherby & Co. 1911. Pp. 1-56; 32 mounted plates.

This volume forms the third of an admirably planned series, designed to present, through the aid of pictures and a brief text, the most interesting facts about celebrities of the bird world. The American osprey is worthy of this distinction, and the field-work, upon which this biography is based, although "necessarily limited to the brief opportunities of a business man," has been prepared with commendable care. We venture to express the

hope that more business men, and representatives of the professions may in time come to reap the profits and enjoyments which an intelligent interest in natural history affords.

The author's studies were made on the coast of New Jersey, at Great Lake, North Carolina, and at that world-famous preserve for ospreys, Gardiner's Island, New York. This tract of 3,000 acres is three miles from the eastern end of Long Island, and is probably unique in that, as we are told, it has been in the possession of the same family for nearly 300 years, or since the time of its purchase from the Indians for "ten coats of trading cloath." It is now maintained as a general farm and preserve, with "a pleasing succession of rolling meadows, thick coverts, stately trees, lakes and grassy marshes." This remarkable island has been the immemorial home of fish hawks, and is now thought to harbor upwards of 200 of their massive nests. Moreover, these gigantic structures are reared with absolute freedom, in almost every conceivable situation, upon the shifting sands of the beach, upon great rocks, in trees or even upon the gable end of a deserted barn or shed. The author shows a nest built on a fence-post and another on a telegraph pole, while in parts of Connecticut these neighborly birds have often taken kindly to the old cart wheel reared aloft for their special benefit on the top of a high pole.

Ospreys are model parents, friendly to man, and exceedingly attractive at all times. Many characteristic attitudes in both young and adult are described and figured by Mr. Abbott, such as flying up the wind in returning to the nest, detouring, repeating and often alighting on any favorite perch other than the nest. Like other birds, they hold closely to the perch, upon which habit has fixed.

Mr. Abbott never saw the parents sprinkle their young with water, but Allen, an earlier observer of this species, found that they occasionally brought fresh seaweed to their eyrie. "Similarly, I have sincere doubts," says the writer, whether the "grateful shade, over the young, of the parent's outstretched wings, is not more accidental than inten-

tional." As a result of long observation we know that shielding is a common practise with nesting birds. It is probably something more than a heat-reflex, since it is most characteristic of the later period of nest-life, when it succeeds the more familiar brooding "habit." This spreading over the young, or shielding attitude, is useful like the other instincts, but whether it is "intentional" or not is quite aside from the main question. We might even have to qualify any sweeping statement that *brooding* was intentional. "Spreading," when away from the nest, is undoubtedly a reflex, and is often apparently due to heat, but birds will spread in a similar manner to dry off when wet.

Young ospreys are fed at long intervals, not oftener than twice or three times a day, though the rate of feeding possibly may vary somewhat with age. At one nest which the author carefully watched, meals were served at 7 P.M. and at 4.15 A.M. and 7 P.M. on the following day. At night the male guards the nest, while its mate broods.

The osprey is said by fishermen to descend four or five feet in the water to strike the flounder, which is often seen in its talons. Fish are always carried head foremost, either the bird's right or left foot being directed forward. It will be interesting to note that the largest capture which Audubon directly observed, was a weak-fish, weighing upwards of five pounds. This bird, he remarked, was barely able to rise from the water, and when shot at it immediately dropped its quarry. Moreover, it was this large and perfect specimen which Audubon introduced into his plate.

Nest-building begins in May and additions to the structure are made throughout the season. A nest once built and occupied is commonly held as a rightful and individual possession, and the structure tends to increase in bulk from year to year. The writer, however, finds that this is not invariably the case, and much more exact knowledge on the history of such nests is greatly needed. A nest of the osprey which was removed from Gardiner's Island to the New York Zoological Garden

weighed 400 pounds and it is thought that the largest nests may even reach the weight of half a ton. At this island the eggs are laid early in May, and two to three in number. Incubation lasts from 24 to 28 days, the young ospreys emerging in close furry down. Nest-life lasts from 5 to 6 weeks, and is over by early August.

We do not for a moment believe that ospreys or any other wild birds suffer the "mental anguish" about their young which the writer generously attributes to them, but we are not disposed to be overexacting with work conscientiously done, and especially when a good moral lesson is enforced.

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*A Text-book of Botany for Colleges and Universities.* By members of the Botanical Staff of the University of Chicago, JOHN MERLE COULTER, Ph.D., Professor of Plant Morphology; CHARLES REID BARNES, Ph.D., Late Professor of Plant Physiology; HENRY CHANDLER COWLES, Ph.D., Associate Professor of Plant Ecology. Vol. II. Ecology. New York, Cincinnati and Chicago. American Book Company, octavo. Pp. x + 485 to 964 + 17.

A little more than a year ago the present writer noticed the first volume (Parts I. and II.) of this notable contribution to the American text-books of botany (SCIENCE, January 6, 1911), and suggested the probable early appearance of Part III. This saw the light about the holidays, and has been before the botanists of the country long enough to have already taken its place as one of the standard texts in its special department of botany. No doubt the first feeling of every botanist was one of surprise at the quite different mode of treatment given to the subject from that which has heretofore been accorded it. Some things hitherto regarded as ecological are entirely left out in Dr. Cowles's treatment or given very little emphasis. No doubt many an "ecologist" will rub his eyes as he looks about him in certain chapters for something familiar.